UDAQ PM2.5 WORKGROUP
Round 2 Meetings: Nov-Dec 2011

Introduction and Key Points

- DAQ scientists have accomplished a lot since the last meetings, and are discovering important things as the science unfolds. But there is still a lot of work to do.

- The workgroups have been instrumental in refining our information, a process we are certain will continue. DAQ appreciates your work.

- We are on schedule and on track, and remain in close collaboration with EPA. Our fundamentals remain unchanged:

  - Do what's right for public health.
  - Develop an approvable SIP.
  - Inclusive and transparent public process.
  - Strive for consensus and the best possible outcome.

Meeting Outline: Refer to Agenda

Segment 1: Process Review and Data Update (9:00-10:10 am)

- Welcome and Meeting Outline
- Constituent Exercise Review and Top Strategies
- Inventory and Modeling Updates (2008/2014/2019)
- Model Runs, the Reduction "Basket" and County-Specific Targets
- Break

Segment 2: Workgroup Breakouts (10:10 am-12:00 Noon)

- Q&A on Segment 1 Presentations
- Breakout Period 1: Area/Mobile/Point at different tables
  - **Facilitators/experts rotate at bell**
- Breakout Period 2: Area/Mobile/Point at different tables
  - **Facilitators/experts rotate at bell**
- Breakout Period 3: Area/Mobile/Point at different tables
  - **Large Group reconvenes**
- Wrap-up, Next Steps, and Voluntary Assignments
- Adjourn

Constituent Group Review

- How did it go from your perspective?
- What DAQ did with your responses?
  - Carefully read each one.
  - Broke them down into tabs:
    - Ranked Strategies
    - Follow-Ups Needed
    - Strategy Analysis
- What did we learn?

1. Survey Response Summary

- Limeask survey service used.
- About 120 sent out, 72 completed (60%)
- 3 completed in September, 66 in October, and 3 in November.
- 45 provided ranked strategies; 40 were reasonably detailed.
- 45 asked clarifying questions or requests; all were systematically considered and addressed.
- 29 made it all the way to number 5.
- 12 letters received through govcomments.com
- It was a challenging process!

2. Top Themes

- Improve transit/bike/pedestrian (24/168)
- Control idling/traffic flow (20/168)
- Implement I/M programs (17/168)
- Reduce VMT programs (13/168)
- Yellow/Red day restrictions (12/168)
- Vehicle technology/retrofit (11/168)
- Livestock measures (10/168)
- General/uniques 24
- Others: PI/Educ/Plann; Alt Fuels; Building Efficiency; Cooking/burning; Solvents; Alt energy; Monitoring

3. Mobile vs. Area vs. Point

- A very significant majority of strategy ideas focused on Mobile sources.

- Area sources blended somewhat into several categories.

- Point sources were discussed mostly in passing.

- In your relative importance rankings, Mobile ranked #1 (33), Area ranked #2 (11), and Point ranked #3 (4)

4. Unique Ideas

- Federal reformulated gasoline
- Adopt California standards on small engines
- Paving dirt roads
- Vapor control at service stations
- Lower LDAR leak definitions
- Utility portfolio changes
- High-efficiency vehicle parking

PI Summary

- The responses were diverse and professional.
- UDAQ considered them carefully, and in many cases made significant adjustments as a result.
- As will be explained later, they were used as a basis for developing a "Basket" of strategies to run through the modeling.

Overview of Technical Information

We'll be presenting some model results, showing:

1. Where we expect to be relative to the NAAQS assuming no additional controls (modeled DV)

2. What benefits we can expect due to the control strategies recommended by the workgroups

3. What additional benefits may be necessary to attain the NAAQS

Overview of Technical Information

We'll be introducing some new concepts to aid in understanding these modeling results

1. How the model is used to make a future prediction

2. What inventories are used in making the prediction

3. How those inventories are prepared

Using the Air Quality Model

Making a Future Prediction

The basic equation:

$$(PM2.5)_{predicted} = (PM2.5)_{monitored\ circa\ 2008} * \left[\frac{(PM2.5)_{modeled\ w/\ future\ inv.}}{(PM2.5)_{modeled\ w/\ 2008\ inv.}} \right]$$

…all PM2.5 values are concentrations, reported in µg/m3

Using the Air Quality Model

Asking Questions about the Future

What would we like to know?

1. How close to the NAAQS would we be if there was no SIP?

2. How much will our SIP strategy help us?

Using the Air Quality Model

1. Let's look at Question no.1, and make an assessment about where we expect to be relative to the NAAQS.

    o The resulting modeled PM2.5 concentration is called the future-year design value.

    o Remember, we're assuming "business as usual" with no additional SIP strategies.

Using the Air Quality Model

- We already know what our <u>monitored design value</u> would be in the present because we measure it.
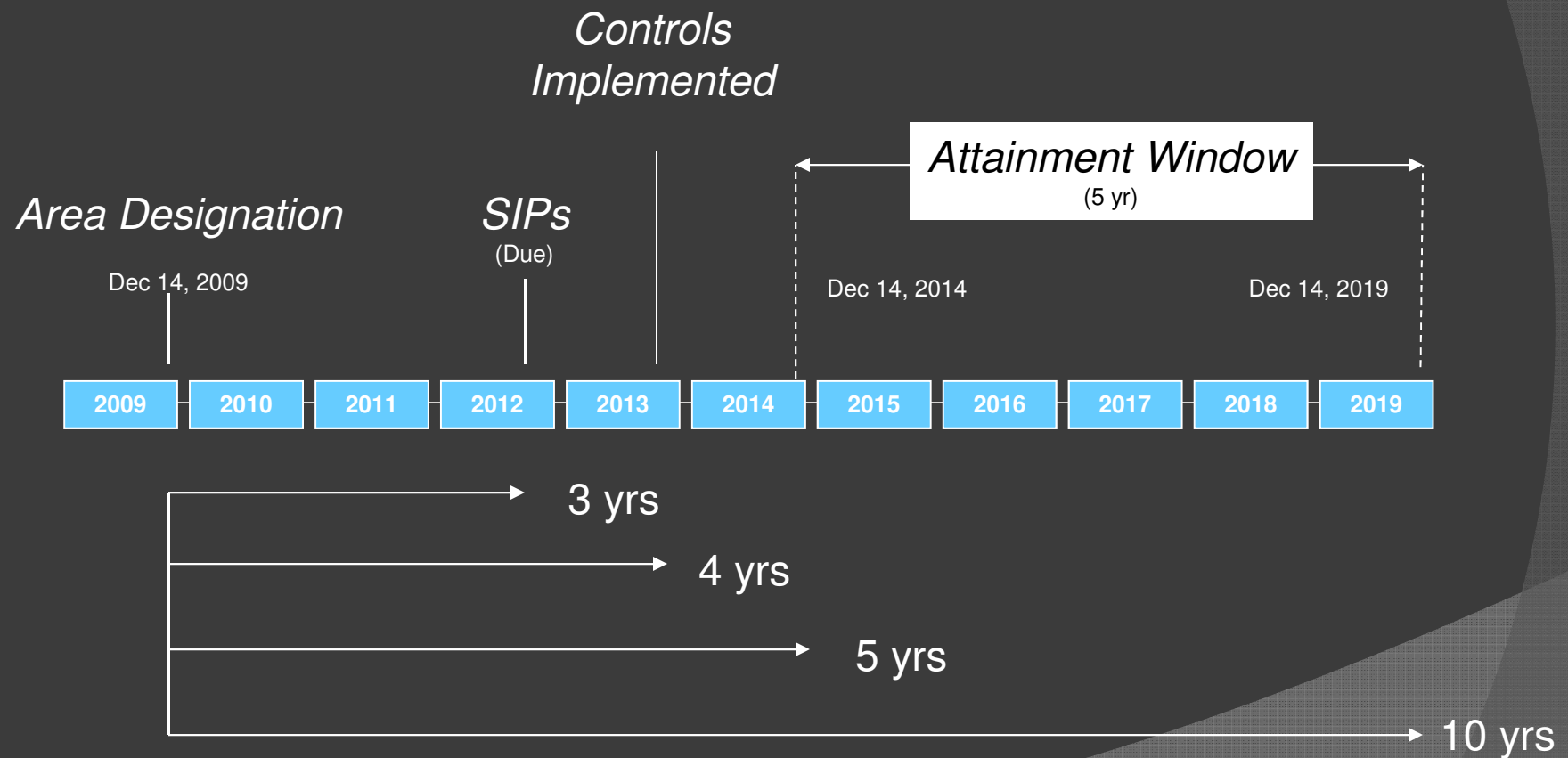
- This value will go into the basic equation.

| Location | County | 3-Year Avg. of 98th %iles | | | Design Values |
		2006 - 2008	2007 - 2009	2008 - 2010	06 - 10
Logan	Cache	36	40	43	40
Brigham City	Box Elder	35	37	42	38
Ogden	Weber	36	41	38	38
Bountiful	Davis	35	38	38	37
Hawthorne	Salt Lake	46	48	44	46
Tooele	Tooele	22	23	26	24
Lindon	Utah	44	50	41	45

Using the Air Quality Model

Now let's pick a time in the future we'd like to know about…

- Like the window in which the Clean Air Act requires us to attain the standard…which is illustrated by the next slide (shown at the previous WG meetings).

Attainment Dates

Controls
Implemented

Attainment Window
(5 yr)

Area Designation

SIPs
(Due)

Dec 14, 2009

Dec 14, 2014

Dec 14, 2019

| 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |

3 yrs

4 yrs

5 yrs

10 yrs

Using the Air Quality Model

We'll be looking at both sides of this attainment window…

- Which means we need the inventories of 2014 and 2019

- Recall from the basic equation, that we'll compare each of these years to 2008

Inventories

2008 – the Baseline Inventory

- Represents *Actual Emissions* from all source categories

Projection-Year Inventories (e.g. 2019)

- Contain *Assumptions* about what emissions are likely to be

Projection-Year Inventories

Sector-specific Assumptions:

- Point Sources
  - Allowable emission rates
    - Greater than actual emission rates
    - Provides legal basis for emission assumptions

- Area Sources
  - Accounts for growth in population
  - Includes economic forecasts

- Mobile Sources
  - Accounts for growth in vehicle miles traveled (vmt)
  - Includes fleet turnover with newer, cleaner vehicles

Inventories

Let's compare these inventories side by side
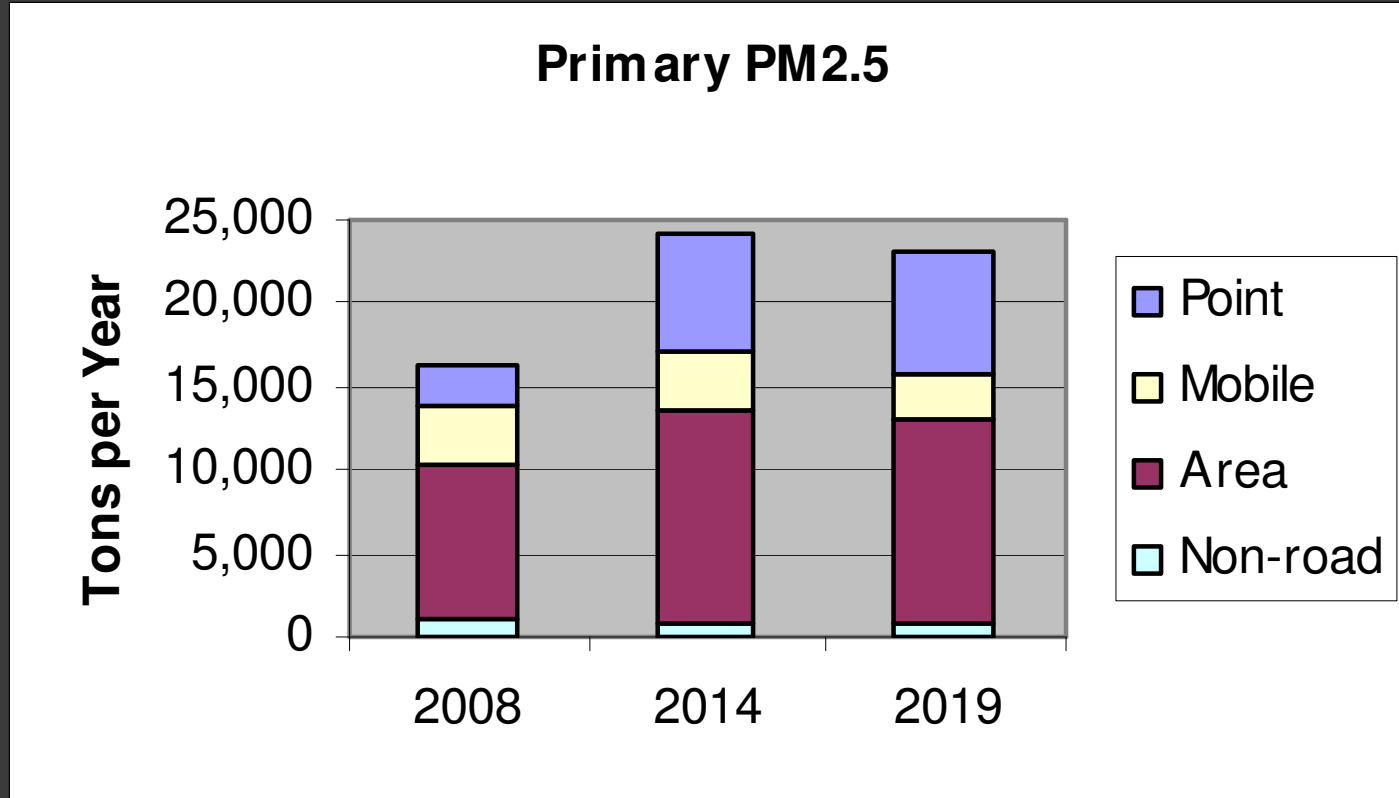
Inventories
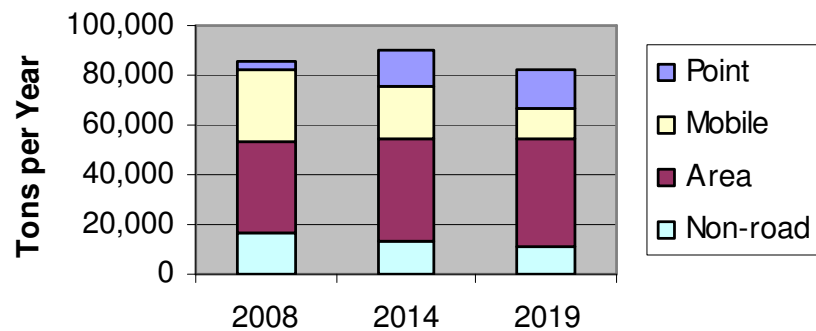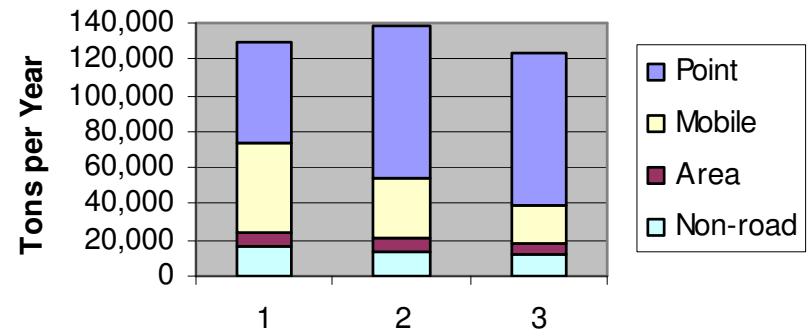
Note: These are (draft) inventories that include emissions throughout the entire modeling domain

Using the Air Quality Model

Back to our Question no.1

Calculating the Future-Year Design Value for 2019:

$$(PM2.5)_{\text{Future DV for 2019}} = (PM2.5)_{\text{monitored circa 2008}} * \left[\frac{(PM2.5)_{\text{modeled w/ 2019 inv.}}}{(PM2.5)_{\text{modeled w/ 2008 inv.}}} \right]$$

…Remember, this assumes no additional SIP strategies

Using the Air Quality Model

What about <u>Question no. 2</u>… How much will our SIP strategy help us?

- Now, we'd be running an <u>*Attainment Test*</u>

- To construct the projection-year inventory:

    - In addition to all the assumptions built in so far (expected growth & existing controls)

    - Modify the inventory to reflect the additional benefits of the SIP strategy

Using the Air Quality Model

And we'd use the equation like this…

Testing for Attainment in some future year:

$$(PM2.5) = (PM2.5) \ast \left[\frac{(PM2.5)_{\text{modeled w/ \textbf{Attainment} inv.}}}{(PM2.5)_{\text{modeled w/ \textbf{2008} inv.}}} \right]$$
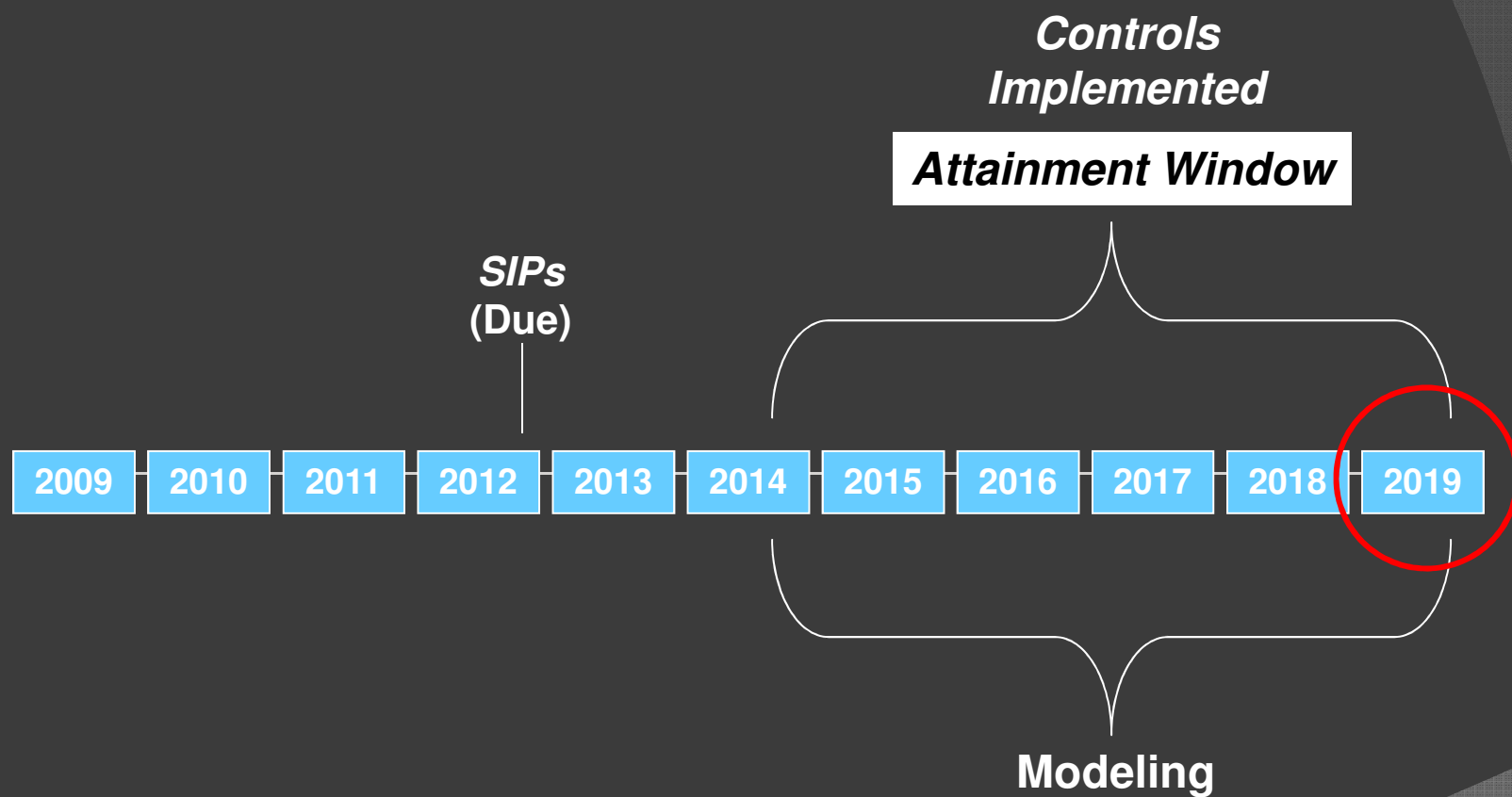
Predicted Concentration   monitored circa **2008**

The resulting value is compared against the 24-hr PM2.5 NAAQS (35 µg/m3)

Model Attainment Test Results
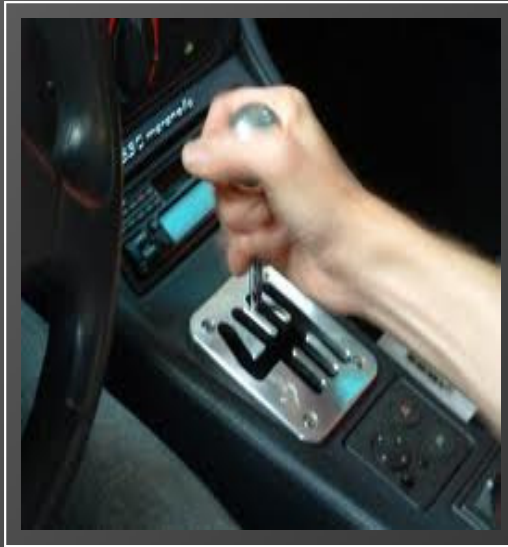
Same Meteorology.   Same Episode(s).   Same Model.
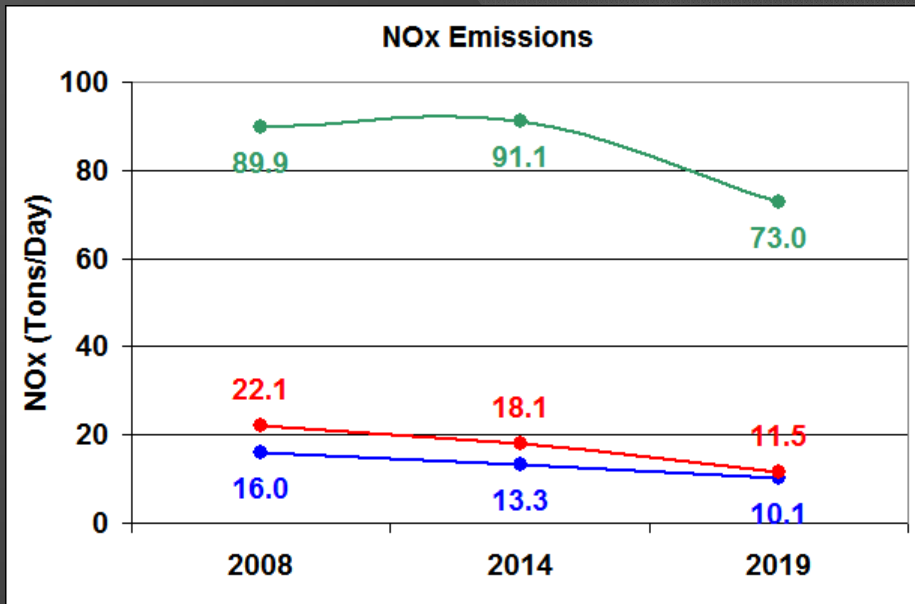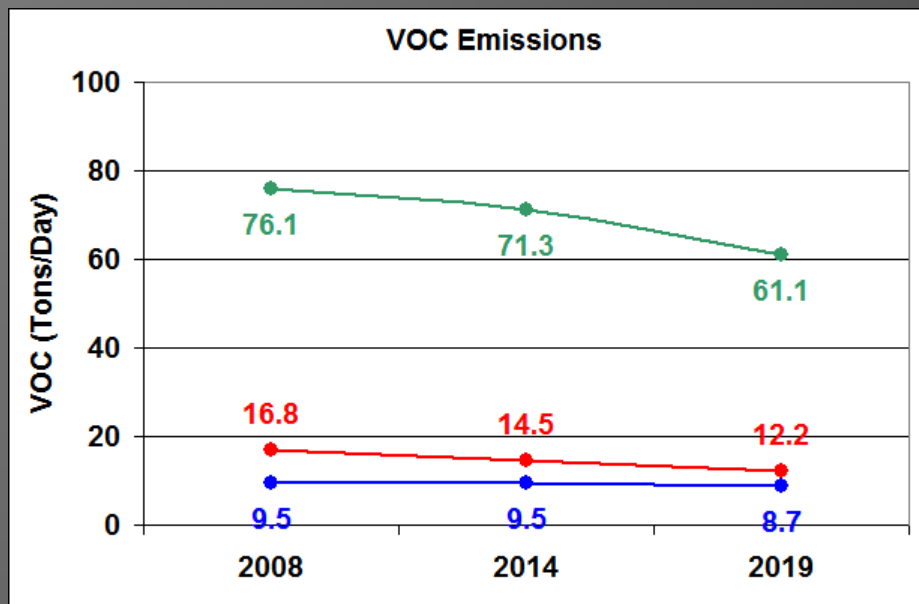
Different Emissions

* **Disclaimer** *

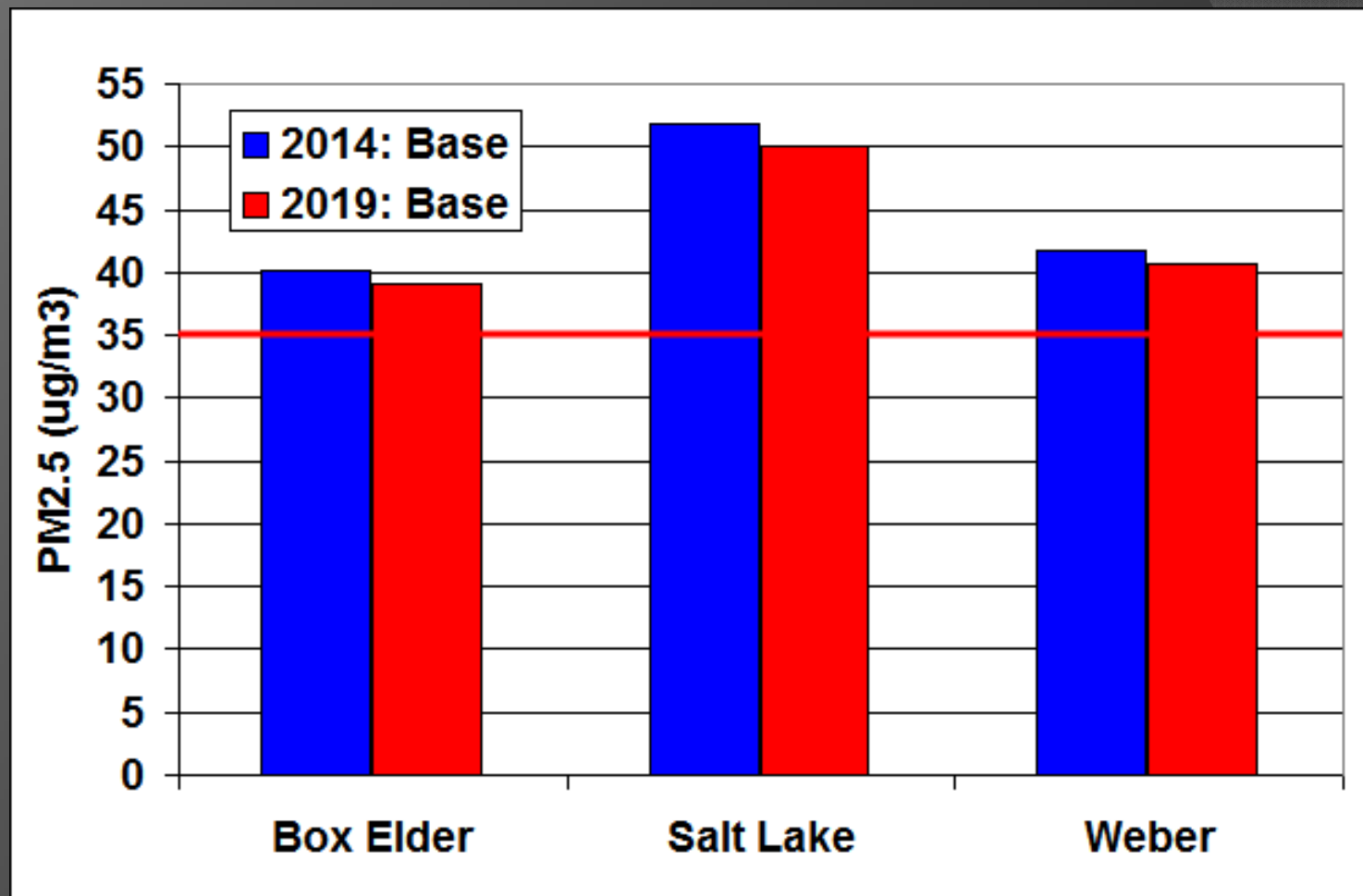Attainment test results are **NOT FINAL** and **WILL CHANGE**

- Wasatch Front Mobile Emissions
- Allowable Emissions
- Design Value Change
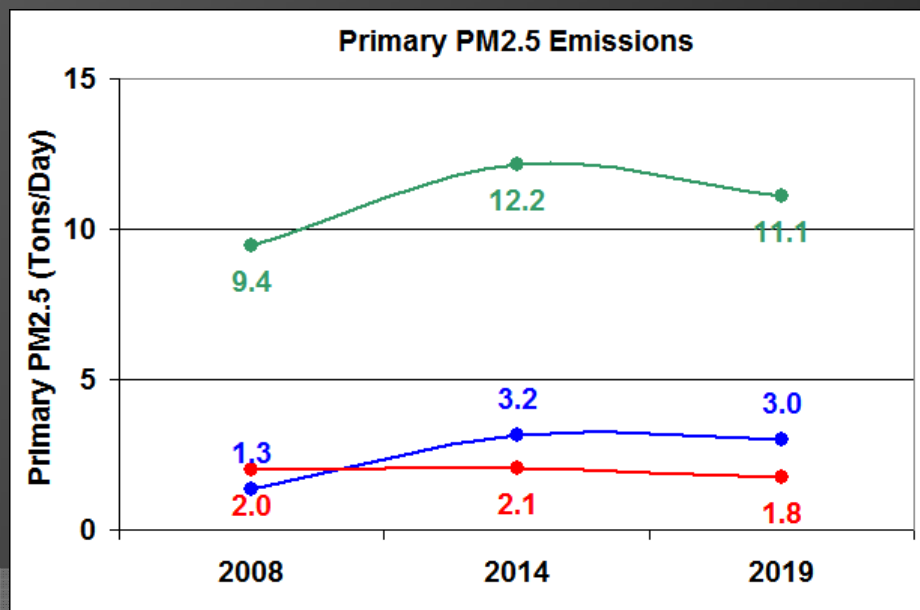
Future Year Model Attainment Test

Basket of Control Strategies - Mobile

- I/M program for counties that currently don't have one
- CARB LEVII vehicle emissions standards
- One pound decrease in RVP
- Bundle of additional measures assumed to achieve a combined 3% reduction:
  - Alternative fuel fleets (e.g. natural gas and electric)
  - Diesel retrofits
  - Idle reduction
  - Trip reduction measures

Basket of Control Strategies – Area

VOC

<u>Excluded from Inventory</u>

1. Categories with existing statewide rules, i.e., fuel transfer, landfill.
2. Seasonal categories, i.e, agricultural burning
3. Biogenic sources and other natural events (fires, including prescribed)
4. Combustion of fuels as they are otherwise regulated
5. Wastewater treatment – regulated predominately by Clean Water Act.

→ 98% of inventory included in strategy

<u>Percent Reduction Determination</u>
Percent reduction through rule making for area sources must include an adjustment for:

Rule Effectiveness – performance expectation in varied operating environments, level of performance under varied operation and maintenance.

Conservative estimates were applied to modeling due to varying technologies and source substitutions that have been made by many industries as they have implemented EPA control technology standards.

Restaurants – 22% VOC and PM
Livestock housing – 20%
Remaining categories – 15%

AMMONIA
Dietary manipulation in swine and poultry
Manure management
5% reduction applied because of control technologies not implemented beyond field testing.

Basket of Control Strategies - Point

- Point source emissions reductions will be addressed through the rule making and application of RACT on a case-by-case basis
- DAQ is working to identify potential reductions for various point sources
  - Focusing on narrowing the gap between actual and allowable emissions
- Assumed a 15-20% reduction in the difference between actual and allowable emissions

Basket of Control Strategies - Summary

- Taken as a whole, the basket of emissions strategies resulted in:
  - 10.3% reduction in primary 2.5
  - 14.2% reduction in VOCs
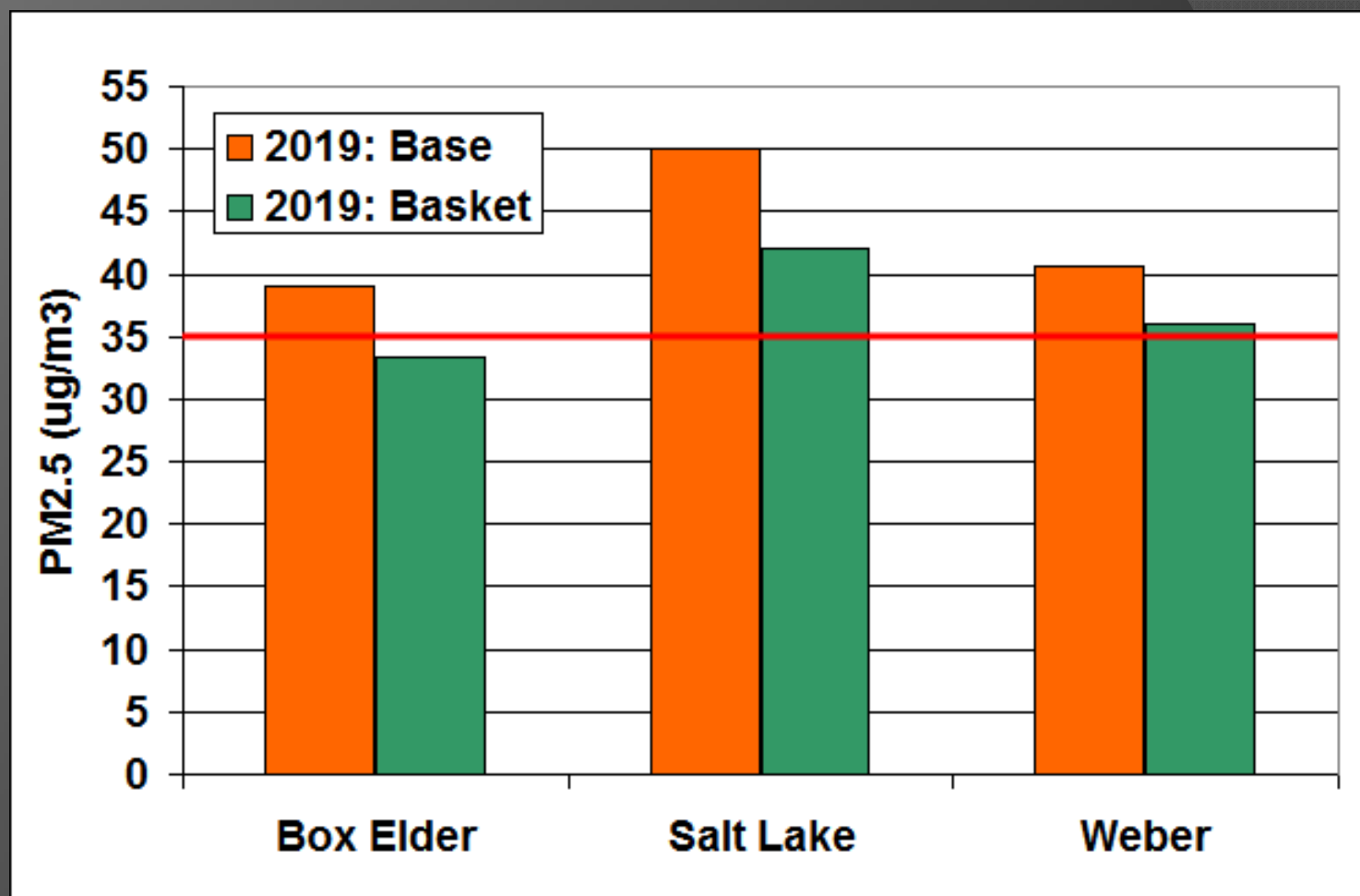 - 9.2% reduction in NOx
  - Additional reductions in other pollutants
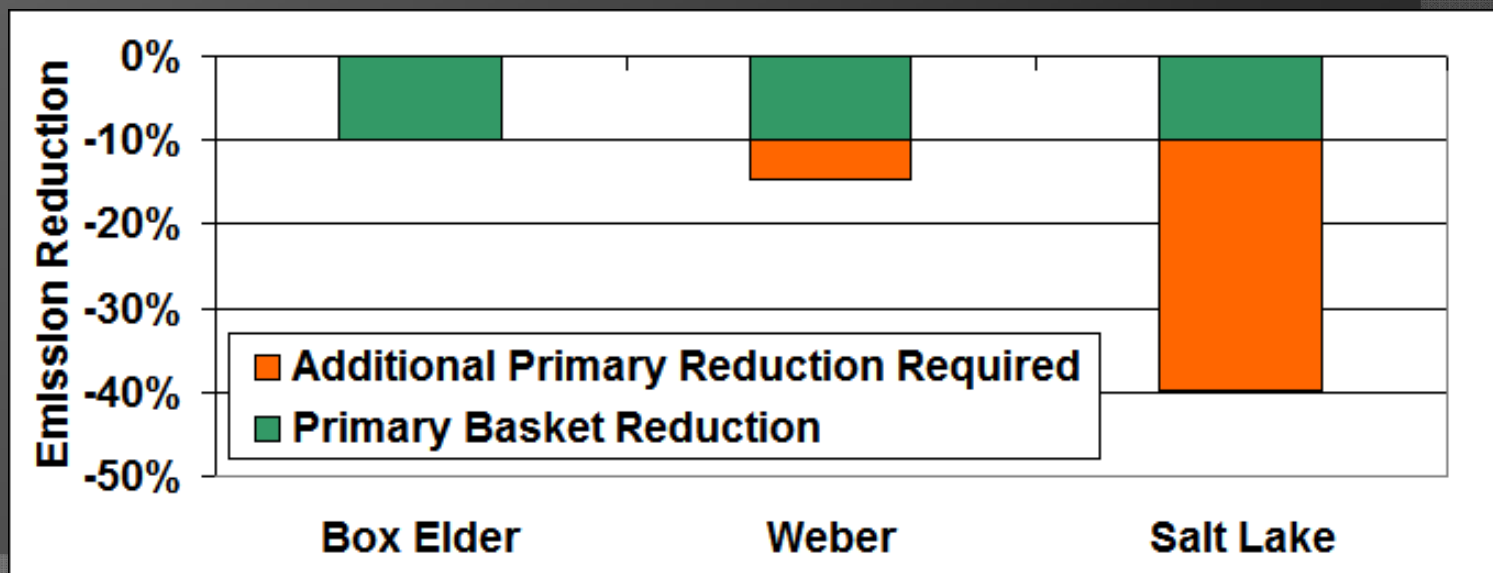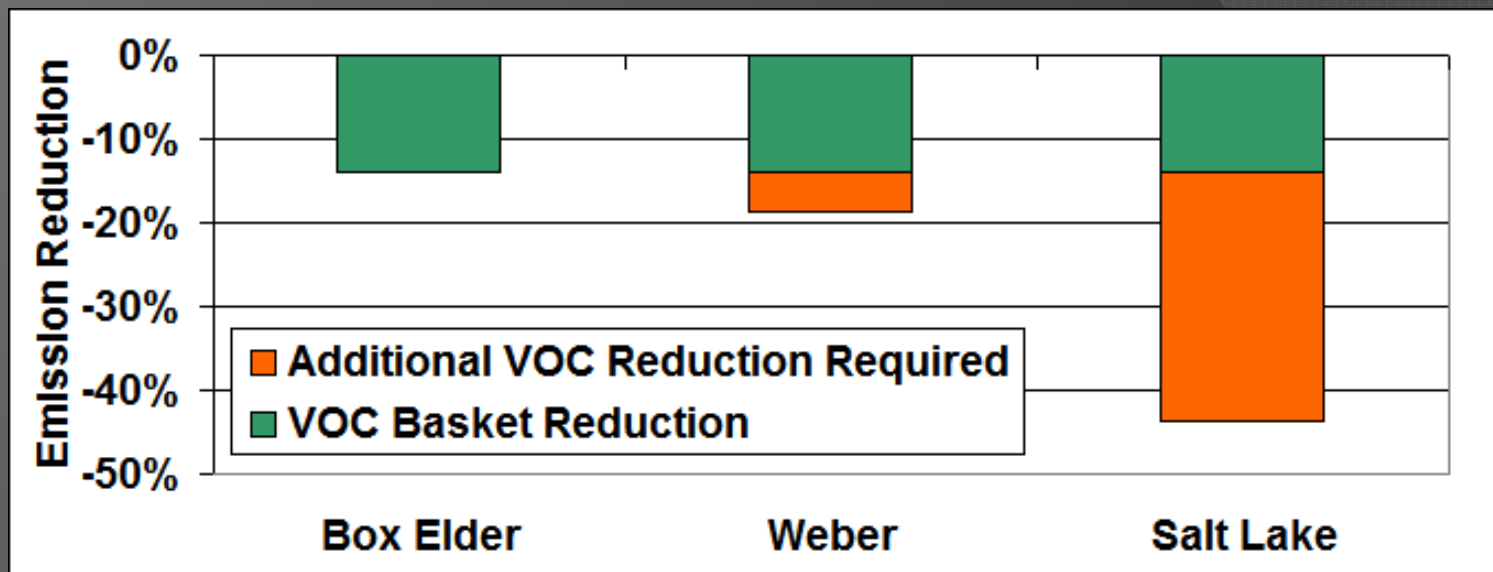
Reminder 1: VOC Sensitive Chemistry
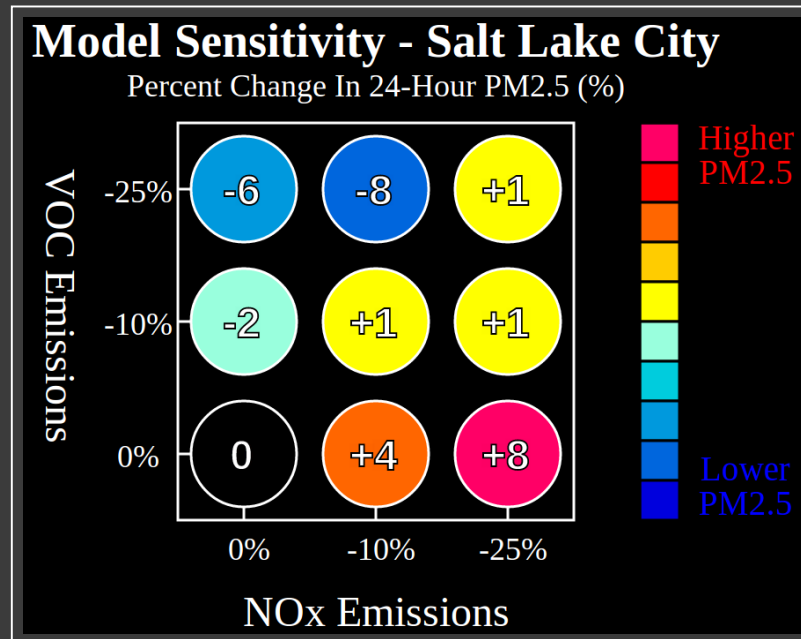
Reminder 2: Primary PM2.5 Emissions
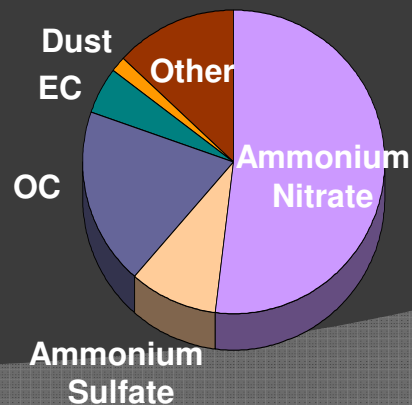
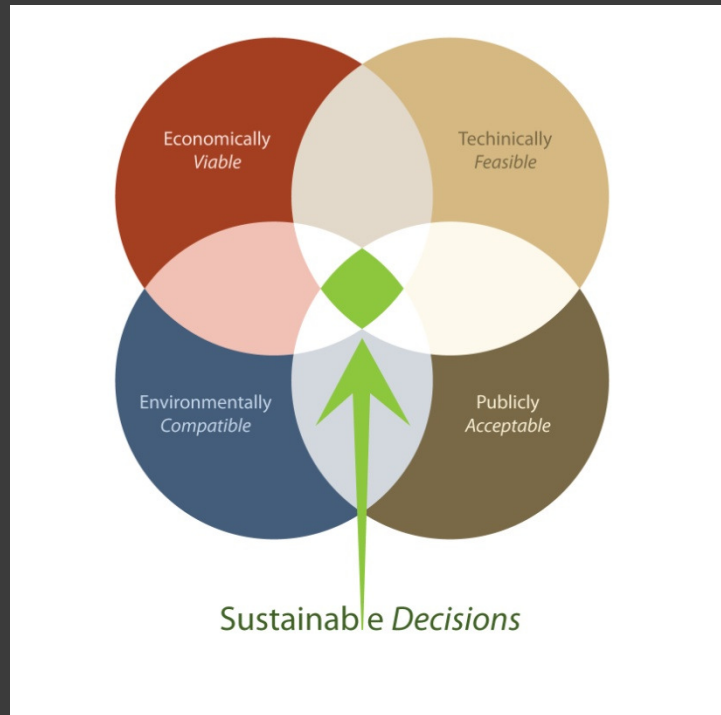# Future Year Basket Strategies

What Reduction Does Attainment Require?

Accomplishments & Challenges

1. **Mobile Emissions Reduced:** Projected improvement through existing programs.

2. **Additional Reductions are Needed from Improvement in All Areas:** Reductions in precursor VOC pollutants and primary fine particulates are the most promising for overall PM2.5 improvement; these reductions can be achieved in all source categories

3. **Large Cities are a Problem:** SLC pollution still affects the outlying counties' ability to claim attainment status. However, these strategies do improve the local airshed and allow the areas to individually meet the federal health standard.

4. **Reduce Point Source Allowable "Gaps":** DAQ will work vigorously with all source categories, and will make a specific effort to work with large point sources to bring allowable (permitted) and enforceable emissions rates more in line with actual emissions.

The Decision Space and Breakout Rules

Economically *Viable*
Techinically *Feasible*
Environmentally *Compatible*
Publicly *Acceptable*

Sustainable *Decisions*

Breakout Roles and Rules

•30 minutes at each table (area/point/mobile) – facilitators rotate.

•You are assigned to the table matching your agenda color.

•The purpose is an open forum for you to ask specific questions, add information, and (most importantly) discuss "basket" and other strategies UDAQ thinks are high-value options.

•UDAQ will record key questions and ideas, and will dutifully respond. An optional survey will follow to assess your attitudes about the strategies that have been discussed.

Rules:
1. **Listen Actively**: Listen carefully to the other participants and to your own reactions. Only one participant may speak at a time. All may speak in order.
2. **Respect**: Others may have a viewpoint you had not considered; allow expression of other ideas, even if you disagree. The goal is not to agree, but to develop a deeper understanding.
3. **Speak up, but Play Nice**: Share your views fully and honestly with everyone. All are encouraged to respectfully challenge an idea or ask questions, but no participant may criticize or attack another (verbally or non-verbally.)
4. **No Disruptions**: Stay engaged with your group and avoid side conversations. Also please turn cell phones and pagers off.